Field induced Fermi surface instabilities in UPd_2Al_3

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Fermi surface (FS) instabilities, such as Lifshitz transitions, which have been neglected in mean field theories has recently been mentioned as a driving force to modify the ground-state properties in correlated electron systems such as cuprates, pnictides and heavy fermion materials. Due to the strong quasiparticle renormalization, the latter possess flat bands close to the Fermi level. Theses flat bands are extremely sensitive to external parameters such as doping, pressure or magnetic field. In particular, field induced Lifshitz transitions have been identified in an increasing number of systems [1,2]. I will present recent thermoelectric power (TEP) measurements in the antiferromagnetic superconductor UPd_2Al_3. A succession of anomalies appears at low temperature as a function of magnetic field below the metamagnetic transition (which occurs at H_M=18T) , see Fig. 1. We can attribute the different anomalies to complex topological changes occurring in the FS. Additionally, we observe a sudden change of sign in the TEP and in the Hall coefficient at H_M from the AF state to the polarized paramagnetic (PPM) state. The appearance of large TEP quantum oscillations in the PPM state indicates a strong FS reconstruction above H_M due to the unfolding of the electronic bands.

[1] A. Pourret, et al., J. Phys. Soc. Jpn. 82, 053704 (2013)
[2] G. Bastien, et al., Phys. Rev. Lett. 117, 206401 (2016)

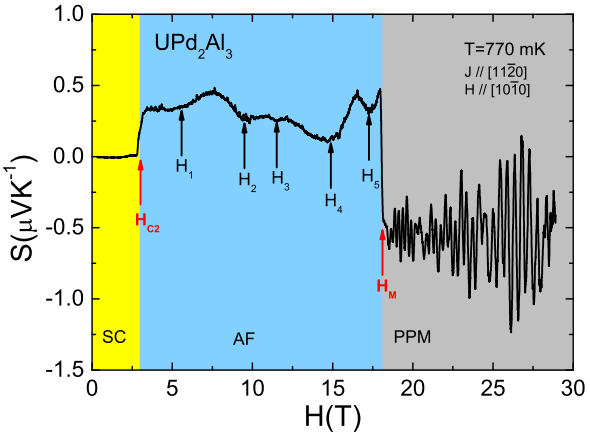

Figure 1: Field dependence of the thermoelectric power at T =770 mK.